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# EPAct Program Update for Chet France

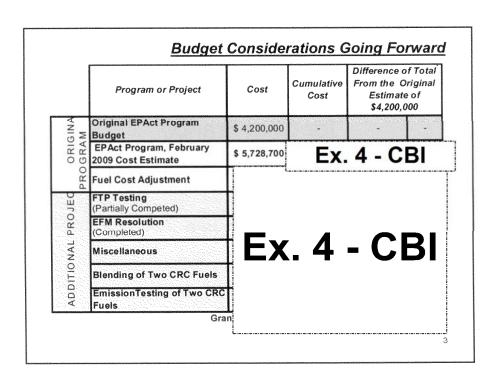
Status and Budget

March 2, 2009

1

### Status of Testing and Fuel Blending

- · Phase 1 testing complete
  - 75°F testing of 19 vehicles on 3 fuels (E0, E10, E15)
- · Interim FTP-cycle testing complete
  - 75°F testing of 6 vehicles on 3 fuels (E0, E10, E15)
- Phase 2 testing complete
  - 50°F testing of 19 vehicles on 3 fuels (E0, E10, E15)
- · Phase 3 testing expected to begin next week
  - 75°F testing of 10? (originally19) vehicles on 27 fuels (E0, E10, E15, E20)
- Test fuel development being done by Haltermann and ASD
  - EPA defines fuel recipes
  - Haltermann prepares hand blends, bulk blends and performs fuel analyses
- 22 of the 28 fuels needed in Phase 3 have been blended in bulk
  - 13 have been delivered to SWRI



# Budget Considerations Going Forward (Cont'd) Original program cost estimate: \$4,200,000 Cost overrun wrt the original scope of program: Ex. 4 - CBI Cost overrun including additional projects Ex. 4 - CBI Funds spent or incurred as of Feb. 19, 2009 Ex. 4 - CBI Funds "remaining" in LD EPAct budget as of Feb. 19, 2009: Ex. 4 - CBI Estimated cost of Phase 3: Ex. 4 - CBI Estimated cost of testing 2 CRC fuels in Phase 3: Ex. 4 - CBI New funds needed to get us through the end of fiscal year Ex. 4 - CBI

### Causes of Cost Overrun

- Unrealistically low original cost estimates by SWRI
  - Underestimation of base program cost : Ex. 4 CBI
    - · On January 7, 2009, SWRI was estimating base program cost overrun by 10% vs. 36.4 % on Feb. 5, 2009
    - Unexpectedly high cost of "coming up to speed" Ex. 4 CBI
    - · Additional checkout tests to resolve HC analyzer saturation and secondary dilution ratio issues in Phase 2 Ex. 4 - CBI
    - Higher than originally estimated test replication rate (+6%): Ex. 4 CBI
- Fuel cost increase (modified fuel development protocol): Ex. 4 - CBI
- Blending of two CRC fuels: \$55,000
- · Additional tasks;
  - EFM resolution Ex. 4 CBI
  - Fuel matrix redesign Ex. 4 CBI
  - FTP testing: Ex. 4 CBI

### Program execution problems:

- · Inadequate temperature control in Phase 2 of the program
- · Fuels blended for Phases 1 and 2 contained undesireable

### **Options to Reduce Cost**

- Delay testing of CRC fuels: \$195,000
- Reduce the number of test fuels
  - Reduction of the number of fuels by 1 would drop the G-efficiency of emission models below the minimum acceptable limit of 50% Mints paretters
    - · Coverage drops, fuel effects become confounded
  - The emphasis of this program is on fuels, not vehicles
- Reduce the number test vehicles
  - Reduction of the number of vehicles from 19 to 15 doubles the probability of getting a non-significant result in emission models. The power of the statistical test of 0.80 is the lowest acceptable in std practice (0.95 was used in AutoOil)
    - · We are working with DOE on vehicle selection
  - Reducing the number of test replicates from 2 to 1 has an even stronger impact.
- Eliminate continuous THC, NOx... measurements in raw exhaust
  - Would make critical types of information unavailable

The cost of HC and alcohol/carbonyl speciation:

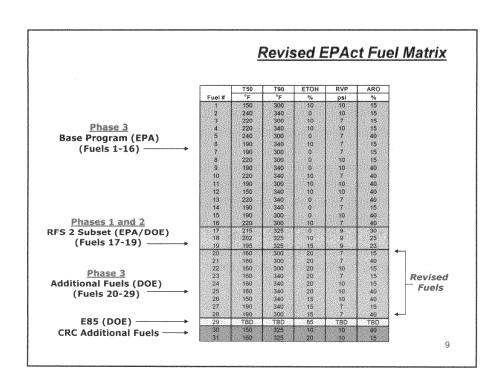
- Minimal savings
- Reduce the scope of exhaust HC speciation
- Ex. 4 CBI
- Data necessary for AQ modeling and toxic emission factors
  - · Phase I and II data not adequate due to fuel blending problems

### Options to Reduce Cost (Cont'd)

- Work with SWRI to reduce program cost
- · Request additional DOE support

7

## Back-up Slides



### Light Duty Exhaust Program Summary

- EPA/DOE collaboration
- Objective: Establish effects of RVP,T50,T90, aromatic content and EtOH on exhaust emissions from Tier 2 vehicles
- Fuel matrix includes 29 fuels + 2 added by CRC = total of 31
- Test Program Design
  - Phase 1: RFS 2 Pilot at 75°F
    - 3 fuels (E0, E10 and E15) tested in 19 vehicles
    - Test results to be available for RFS 2 NPRM
  - Phase 2: RFS 2 Pilot at 50°F
    - Same as Phase 1, except temperature
  - Phase 3: Main Program
    - 27 fuels tested in 19 Tier 2 vehicles, E85 tested in 4 FFVs
- LA92 test cycle used throughout the program
- Species measured: Regulated emissions, CO<sub>2</sub>, NO<sub>2</sub>, VOCs, ethanol, carbonyl compounds
  - N<sub>2</sub>O, NH<sub>3</sub> and HCN by FTIR
  - Some PM and SVOC speciation

### Measured Species

- Bag (phase) level and composite emissions of THC, NMHC, NMOG, CO, CO<sub>2</sub>, NOx, NO<sub>2</sub>, ethanol and PM
- Bag (phase) level speciated volatile organic compounds (VOCs)
  - · Over 200 compounds, incl. alcohols and carbonyls
- Continuous and integrated by bag (phase) emissions of the following species in raw exhaust:
  - THC, NMHC, CO, CO<sub>2</sub>, NOx
  - N<sub>2</sub>O, NH<sub>3</sub> and HCN by FTIR for a subset of tests
- Semi-volatile and high molecular weight VOC and PM measured in Phases 1 and 2 only

11

### Projected Schedule Going Forward

- · Launch of Phase 3 testing: Mid-February 2009
- · Completion of Phase 3 testing: Early December 2009
- Reporting: December 2009 mid-March 2010

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